REMARKS

The Office Action dated May 29, 2008 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto. Claims 1-5, 7-14, and 16-20 are currently pending in the application and are respectfully submitted for consideration.

The Office Action rejected claims 1-5, 7-12, 14 and 16-20 as being anticipated by Saleh (US 7,200,104). This rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-4 are dependent, recites a method including monitoring in an intermediate tree element the state of a critical up-link, the critical up-link being an only link from the intermediate tree element to an upper stage tree element in the tree structure. The method further includes detecting, in the intermediate tree element, a link-down state in the critical up-link, and setting, in the intermediate tree element, a dependent down-link in a link-down state, if said critical up-link is detected to be in the link-down state, the dependent down-link leading to a lower stage tree element in the tree structure and being an only link from the intermediate tree element to the lower stage tree element in the tree structure. The redundant tree structured local area network comprises at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage.

Claim 5, upon which claims 7, 8, and 19 are dependent, recites a method including monitoring, in a host device, the state of an active up-link in a host device leading to an intermediate tree element in a first tree, detecting, in the host device, a link-down state in the active up-link, and notifying host software about the link-down state. The method further includes starting a recovery process in the host device by changing the failed active up-link to a redundant up-link leading to an upper stage intermediate tree element in a second tree. The redundant tree structured local area network comprises at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage.

Claim 9, upon which claims 10-13 are dependent, recites an apparatus including a controller. The controller is configured to monitor the state of a critical up-link, the critical up-link being an only link to an upper stage tree element in the tree structure of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises to at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage. The controller is also configured to detect a link-down state in the critical up-link, and set a dependent down-link in a link-down state, the dependent down-link leading to a lower

stage tree element in the tree structure and being an only link to the lower stage tree element in the tree structure.

Claim 14, upon which claim 20 is dependent, recites an apparatus including a controller. The controller is configured to monitor the state of an active up-link leading to an intermediate tree element in a first tree of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage. The controller is further configured to detect a link-down state in the active up-link, notify host software about the link-down state, and start a recovery process by changing the failed active up-link to a redundant up-link leading to an upper stage intermediate tree element in a second tree.

Claim 16 recites an apparatus including monitoring means for monitoring the state of a critical up-link, the critical up-link being an only link to an upper stage tree element in the tree structure of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage. The apparatus also includes detecting means for detecting a link-down state in the critical up-link, and setting means for setting a dependent down-link in a link-

down state the dependent down-link leading to a lower stage tree element in the tree structure and being an only link to the lower stage tree element in the tree structure.

Claim 17 recites an apparatus including monitoring means for monitoring the state of an active up-link leading to an intermediate tree element in a first tree of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage. The apparatus also includes detecting means for detecting a link-down state in the active up-link, notifying means for notifying host software about the link-down state, and starting means for starting a recovery process by changing the failed active up-link to a redundant up-link leading to an upper stage intermediate tree element in a second tree.

Claim 18 recites a system including a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage. The system also includes at least one apparatus comprising a controller configured to monitor the state of a critical up-link, the critical up-link being an only link from the intermediate tree element to an upper stage tree element in the tree structure; to detect a link-down state in the critical up-link, and to set a dependent down-link in a link-down state, if said critical up-link is detected to be in the

link-down state, the dependent down-link leading to a lower stage tree element in the tree structure and being an only link from the intermediate tree element to the lower stage tree element in the tree structure. The system further comprises at least one host device comprising a controller configured to monitor the state of an active up-link in a host device leading to an intermediate tree element in a first tree, to detect a link-down state in the active up-link, to notify host software about the link-down state, and to start a recovery process by changing the failed active up-link to a redundant up-link leading to an upper stage intermediate tree element in a second tree.

In view of the above, embodiments of the present invention may enable a considerably fast detection time of a failure. As a result, the recovery time can be reduced significantly. Additionally, according to embodiments of the invention, the fault detection does not load the LAN, and the usability of the invention does not require that there is an IP address bound to all ports to be monitored.

As will be discussed below, Saleh fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the features and advantages discussed above.

Saleh discloses a method for restoring a virtual path, provisioned between a source and a target node, in a zoned mesh optical network. The method includes allocating a primary and a secondary physical path to the virtual path. The two physical paths are network element and link disjoint. In case of a failure in one physical path, the end nodes switch the virtual path to the other physical path.

Applicants respectfully submit that Saleh fails to disclose or suggest all of the elements of the present claims. For example, Saleh does not disclose or suggest, at least, "monitoring in an intermediate tree element the state of a critical up-link, the critical up-link being an only link from the intermediate tree element to an upper stage tree element in the tree structure; detecting, in the intermediate tree element, a link-down state in the critical up-link; and setting, in the intermediate tree element, a dependent down-link in a link-down state, if said critical up-link is detected to be in the link-down state, the dependent down-link leading to a lower stage tree element in the tree structure and being an only link from the intermediate tree element to the lower stage tree element in the tree structure, wherein the redundant tree structured local area network comprises at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage" as recited in claim 1.

Saleh also does not disclose or suggest, at least, "starting a recovery process in the host device by changing the failed active up-link to a redundant up-link leading to an upper stage intermediate tree element in a second tree," and "wherein the redundant tree structured local area network comprises at least two separate subtrees ending to a set of same host devices," as recited in claim 5 and similarly recited in claim 17. Similarly, Saleh fails to disclose or suggest a controller configured to "monitor the state of a critical up-link, the critical up-link being an only link to an upper stage tree element in the tree

structure of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises to at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage, detect a link-down state in the critical up-link, and set a dependent down-link in a link-down state, the dependent down-link leading to a lower stage tree element in the tree structure and being an only link to the lower stage tree element in the tree structure," as recited in claim 9 and similarly recited in claims 16 and 18.

Further, Saleh also does not disclose or suggest a controller configured to "monitor the state of an active up-link leading to an intermediate tree element in a first tree of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage, detect a link-down state in the active up-link," and "start a recovery process by changing the failed active up-link to a redundant up-link leading to an upper stage intermediate tree element in a second tree," as recited in claim 14.

Applicants note that a "claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference" *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Additionally, the "identical invention must be shown in as

complete detail as is contained in the...claim" Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Applicants submit that the final Office Action has failed to establish a prima facie case for anticipation as Saleh fails to disclose each element of the claimed invention, as will be discussed in further detail below.

As evidenced by a review of Saleh, the reference fails to teach a redundant tree-structured network, as provided by the claimed invention. Instead, the solution disclosed in Saleh is directed to a mesh network. According to Saleh, when a physical path of a virtual path (VP) fails at a tandem node (intermediate node in the mesh network), the tandem node initiates a path restoration request for the end nodes (the tandem node sends a restore request both upstream and downstream. When another tandem node receives the restore request it forwards the request on appropriate link to the next node. When an end node receives the restore request, it switches the VP to a standby physical path (see Saleh, col. 4, lines 45-65). Therefore, one of the distinctions between the claimed invention and Saleh is that the claimed invention is directed to a redundant tree structured network, whereas Saleh only discloses a mesh network.

Another distinction between the claimed invention and Saleh relates to actions performed when failure occurs. According to the present invention, information about the failure "flows" down towards a host device differently than in Saleh. As an illustrative example of the present invention, the host device is stage 0, there are three stages above the host device, and the critical uplink (leading to stage 3) of an

intermediate tree element at stage 2 is detected to be in the link-down state. Since there is only one link between the tree elements of stages 2 and 3, the intermediate node at stage 2 sets its dependent downlink to a link-down state (where the dependent downlink is an only link from the intermediate tree element to the lower stage (stage 1) tree element in the tree structure. Now, when the intermediate tree element at stage 1 detect that its critical uplink is in a link-down state, it set its dependent downlink to a link-down state. In this example, the dependent downlink is an active uplink of a host device at stage 0. When the host device detects the uplink to be in the link-down state, it starts a recovery process.

As present claim 1 recites, "*setting, in the intermediate tree element, a dependent down-link in a link-down state, if said critical up-link is detected to be in the link-down state*". This means that when a critical link fails in an intermediate tree element, the whole path finally ending to the host device is set to link-down state. This is completely different than what Saleh teaches. In Saleh, only one link between two network elements fails (cannot be used), whereas the remaining links in the mesh network remain functional.

A further difference between the claimed invention and Saleh is the way the host device detects a failure. In Saleh, the host device (end node) receives a path restoration request from an intermediate node, and acts based on the restoration request. According to the present invention, on the other hand, the host device detects the failure when an

active uplink towards an intermediate node in the upper stage in the tree switches to linkdown state.

Thus, even if a skilled person were motivated to apply the teachings of Saleh into a tree structured network (not admitted), the skilled person would only come to a solution in which information about link failure between two nodes in the tree is sent downwards (towards host devices) in the tree, and finally a host device would receive the information. The host device, however, cannot perform any correct recovery actions because it does not have any information about the tree network topology.

Therefore, for at least the reasons discussed above, Applicants respectfully submit that Saleh fails to disclose or suggest all of the elements of claims 1, 5, 9, 14, and 16-18. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Claims 2-4, 6-8, 10-13, and 19-20 are dependent upon claims 1, 5, 9, and 14, respectively. As such, claims 2-4, 6-8, 10-13, and 19-20 should be allowed for at least their dependence upon claims 1, 5, 9, and 14, and for the specific limitations recited therein.

Claim 13 was rejected as being unpatentable over Saleh in view of Lamport (US 5,138,615). This rejection is respectfully traversed for at least the following reasons.

Saleh is discussed above. Lamport discloses that a mesh connected local area network provides automatic packet switching and routing between host computers coupled to the network. The network has a multiplicity of cut-through, nonblocking switches, each capable of simultaneously routing a multiplicity of data packets. Low

host-to-host latency is achieved through the use of cut-through switches with separate internal buffers for each packet being routed. The switches are interconnected with one another and are coupled to the host computers of the network by point to point full duplex links. While each switch can be coupled to ten or more network members, i.e., switches and hosts, each link is coupled to only two network members and is dedicated to carrying signals there between. Whenever a new switch or link is added to the network, and whenever a switch or link fails, the switches in the network automatically reconfigure the network by re-computing the set of legal paths through the network.

Claim 13 is dependent upon claim 9. As discussed above, Saleh fails to disclose or suggest all of the elements of claim 9. Furthermore, Lamport does not cure the deficiencies in Saleh as Lamport also fails to disclose or suggest a controller configured to "monitor the state of a critical up-link, the critical up-link being an only link to an upper stage tree element in the tree structure of a redundant tree structured local area network comprising at least two separate subtrees ending to a set of same host devices, wherein each subtree comprises to at least one intermediate stage and wherein an intermediate stage tree element of one tree is not directly connected to an intermediate stage tree element of another tree at the same stage, detect a link-down state in the critical up-link, and set a dependent down-link in a link-down state, the dependent down-link leading to a lower stage tree element in the tree structure and being an only link to the lower stage tree element in the tree structure." Accordingly, the combination of Saleh and Lamport does not disclose or suggest all of the elements of claim 13. In addition,

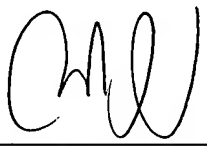
claim 13 should be allowed for at least its dependence upon claim 9, and for the specific limitations recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art fails to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-5, 7-14, and 16-20 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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